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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/052,801	10/29/2001	Richard D. Posner	23608-0701	3222

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EXAMINER	
JAMAL, ALEXANDER	
ART UNIT	**PAPER NUMBER**
2643	

DATE MAILED: 07/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/052,801	POSNER ET AL.	
	Examiner	Art Unit	
	Alexander Jamal	2643	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Based upon the submitted amendment (5-5-2005), the examiner notes that claims 1,9,10,12,14,17,20,21,31,33 have been amended.

2. Examiner withdraws objections to claims 12,17,21.

3. Examiner withdraws 35 USC 112 rejections to claims 12 and 17.

4. Examiner submits a new set of non-final rejections based upon new prior art.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. **Claims 1,9-33** rejected under 35 U.S.C. 102(b) as being anticipated by Kim et al. (5877653).

As per **claim 1,** Kim discloses a feed-forward linear amplifier controlled by a spurious ratio (ABSTRACT). The amplifier comprises first monitoring point 232 (Fig. 2) coupled to a first loop and a second monitoring point (234) coupled to the amplifier output. The amplifier comprises control circuitry (comprised of units 235,236,237). The control circuitry comprises inputs coupled to the first and second monitoring points, and control outputs used to control the amplifier (via ATT1,PIC1,ATT2,PIC2). The system further comprises frequency information (PCD) applied to the control unit (Col 6 lines 40-52). The control system controls the spurious ratio of the noise (spurious) to the signal level by adjusting the phase and gain of each stage in the feed-forward amplifier. The system further acts to minimize the ratio of input noise (couplers 231,233 in Fig. 2) to output noise (coupler 234) by adjustment of the phase and gain of signals within the feed-forward amplifier.

As per **claim 17,** claim rejected for same reasons as claim 1 rejection. Kim's system may receive a multi carrier input signal (Col 1 lines 25-45) via input sampling coupler 216 (Fig. 2). Coupler 216 is coupled to output a signal to phase and gain circuitry (211,212,213), which are coupled to output to amplifier 214 that outputs an amplified input signal and spurious components. The amplifier further comprises distortion sampling coupler 218 (or 232) coupled to the output of amplifier 214. The system further comprises a summing coupler 219 (coupled with the distortion coupler) with an input from delay line 217, with delay line 217 also coupled to the output of coupler 216. The system further comprises first monitoring coupler (233) coupled to the

output of summer 219. The system further comprises second delay line 215 coupled to the output of amplifier 214 (which comprises distortion sampling coupler 218) in order to shift the phase of the amplified signal so as to be inverted (back phase) (Col 21 lines 10-32). The amplifier further comprises a second monitoring coupler (234) coupled to the output of coupler 223. The amplifier further comprises second phase and gain circuitry (220,221) coupled to the signal monitored by coupler 233, and further coupled to output to error amplifier 222, which outputs to coupler 223 (error signal injection coupler). The amplifier further comprises a control unit (units 235,236,237) that receives inputs from the first and second monitoring points, receives frequency information for the signal (PCD), and sends outputs to the second phase and gain circuitry.

As per **claims 9, 10,** Kim discloses monitoring points 218,232,233 (Fig. 2).

As per **claims 11,12,14** claim rejected for same reasons as claim 17 rejection.

As per **claim 13,** Kim discloses vector modulation using Cartesian coordinates (either amplitude/frequency or (amplitude,frequency,phase)/time) (Col 13 lines 38-65).

As per **claims 15,20,** the system comprises first and second receivers (as part of signal selector 235 and detector 236) for receiving the monitored signals. Controller 237 comprises first and second ratio detectors coupled to the receivers via signal selector 235. The controller inherently detects the ratio of the noise signal that is being measured (ie. the value of the measured signal versus the value of the actual signal at each coupling point 231-234 in the system) for the purpose of being able to produce valid measuring results.

As per **claim 16,** detector 236 comprises mixers 715,718 (Fig. 7) coupled to the first monitoring point (SF), bandpass filter 716, oscillator 714, and PCD (PLL) information 713.

As per **claims 18,19,** the spurious component is intermodulation from a multi-carrier input signal caused by the non-linearity of the amplifier (Col 1 lines 15-60).

As per **claims 21,** claim rejected for same reasons as claim 15 rejection.

As per **claim 22,** the system comprises a predistorter 213 (Fig. 2).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. **Claims 23-30,33** rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (5877653), and further in view of Hassun et al. (6263289).

As per **claims 23,33,** claims rejected as a method performed by the device of the claim 17 rejection. The spurious components are monitored via couplers 233 and 234 (Fig. 2), and the amplifier is controlled so that the phase and gain of the spurious channel and the main channel are aligned so that the ratio of the output spurious signal (detected via coupler 234) to the initially detected distortion signal (detected via coupler 233) is

minimized (ie. the output distortion is suppressed) (Col 11 line 54 to Col 12 line 17). However, Kim does not disclose that the method comprises using a ratio of the noise measurements (spurious components) at various monitoring points in order to adjust the phase/gain parameters of the system.

Hassun discloses a method of measuring IMD in amplifiers used in cellular base stations (such as a feed-forward amplifier) (ABSTRACT). The method comprises forming a ratio between two measured points on either side of a device under test (such as an error loop or pre-distorter loop) (Col 6 line 30 to Col 7 line 5) in order to increase the dynamic range capability of the measurement system (Col 7 lines 10-25). Hassun further discloses that the measuring technique may be used for noise (spurious) power ratio measurements. It would have been obvious to one of ordinary skill in the art at the time of this application to utilize noise ratios in lieu of the individual noise measurements in Kim for the advantage of increasing the dynamic range capability of the system.

As per **claims 24-30,** claims rejected as methods performed by the devices of the claim 1 and 17 rejections.

9. **Claims 31,32** rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (5877653) in view of Hassun et al. (6263289).

As per **claim 31,** Kim discloses claim 31 as per the claim 17 and claim 23 rejections. The system comprises coupler 233 (Fig. 2) and coupler 234. The system additionally comprises coupler 232. The control unit functions to adjust the gain and

phase of the predistortion and error loop signals such that the ratios of output distortion to the predistorter distortion and error loop distortion are minimized. However, Kim does not disclose using a monitoring point directly at the output of the predistortion unit.

The system uses a coupling point 232 directly at the output of the linear amplifier stage. Since the system iteratively acts to minimize the output distortion by varying the phase/gain of the signals within the amplifier loop, and since the gain and phase information from predistorter 213 will carry through to amplifier 214, it would have been obvious to one of ordinary skill in the art at the time of this application that the monitored signal could be coupled from either before or after the main power amplifier as a matter of design choice.

As per **claims 32,** the system further comprises coupler 233.

10. **Claims 2-8** rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (5877653) as applied to claim 1 and further in view of applicant's admitted prior art in the specification (Page 12 lines 9-22).

As per **claims 2-8,** Kim discloses applicant's claim 1. However, Kim does not disclose that the input signal frequency information is provided from one of the following: a bank of synthesizers coupled by one of an RS232, RS485, TCP/IP or I2C bus; an input signal preset; a scanning circuit.

Kim discloses using PCD data in order to recover RF signals information in the amplifier (Col 13 lines 40-50). Applicant's specification discloses that it is known that,

in an RF phone, frequency information may be obtained via a control bus (conforming to a known standard), input signal presets, or a scanning circuit (SPECIFICATION Page 12 lines 9-22). It would have been obvious to one of ordinary skill in the art at the time of this application that the frequency information cold be provided by any of the known methods of obtaining frequency information for the advantage that the feed-forward amplifier may be implemented to be compatible with existing RF phone interfaces (thus saving the cost of adding an additional interface).

Response to Arguments

11. Applicant's arguments with respect to claims 1-33 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Jamal whose telephone number is 571-272-7498. The examiner can normally be reached on M-F 9AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A Kuntz can be reached on 571-272-7499. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9315 for After Final communications.

AJ
July 13, 2005

CURTIS KUNTZ
SUPERVISORY PATENT EXAMINER
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